ICOM

SERVICE MANUAL

VHF MARINE TRANSCEIVER

IC-M45
IC-M45EURO

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-M45/IC-M45EURO** VHF MARINE TRANSCEIVER at the time of publication.
2 versions of the **IC-M45/IC-M45EURO** have been designed. This service manual covers each version.

MODEL	VERSION	COLOR	SYNBOL
IC-M45	U.S.A.	U-Black	USA
	U.S.A.-1	U-White	
IC-M45EURO	ITA	E-White	EUR
	FRA	E-Black	

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 16 V. This will ruin the transceiver.
DO NOT expose the transceiver to rain, snow or any liquids.
DO NOT reverse the polarities of the power supply when connecting the transceiver.
DO NOT apply an RF signal of more than 20 dBm (100mW) to the antenna connector. This could damage the transceiver's front end.



ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:
1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<**SAMPLE ORDER**>

1110003490 S.IC	TA31136FN	IC-M45	MAIN UNIT	5 pieces
8810008660 Screw	PH BO M3x8 NI	IC-M45	Chassis	10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated turning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 40 dB to 50 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to the transceiver.

TABLE OF CONTENTS

SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage : 156.025–157.425 MHz (Tx)
  156.025–163.275 MHz (Rx)
- Mode : 16K0G3E (FM)
- Usable channels :

Model	Version	Channel INT	Channel USA	Channel CAN	Channel WX
IC-M45	[USA]	○	○	○	○
	[USA-1]	○	○	○	○
IC-M45EURO	[ITA]	○	○	×	×
	[FRA]	○	×	×	×

- Power supply requirement : 13.8 V DC ±15% (negative ground)
- Usable temperature range : –20˚C to +60˚C; –4˚F to +140˚F
- Frequency stability : ±10 ppm (–20˚C to +60˚C; –4˚F to +140˚F)
- Current drain (at 13.8 V DC) : Transmit at 25 W 6.0 A
  Receive max. audio 1.2 A
- Antenna impedance : 50 Ω (nominal)
- Dimensions (projections not included) : 152(W)×67(H)×144(D) mm; 6(W)×2⅝(H)×5⅔(D) in
- Weight : 900 g; 2 lb

■ TRANSMITTER

- Output power (at 13.8 V DC) : High 25 W
  Low 1 W
- Modulation : Variable reactance frequency modulation
- Maximum frequency deviation : ±5.0 kHz
- Spurious emissions : 70 dB
- Adjacent channel power : 60 dB
- Residual modulation : 40 dB
- Audio harmonic distortion : Less than 10% at 70% deviation
- Audio frequency response : +1 dB to –3 dB of 6 dB octave from 300 Hz to 3000 Hz

■ RECEIVER

- Receive system : Double conversion superheterodyne system
- Intermediate frequencies : 1st 30.85 MHz
  2nd 450 kHz
- Sensitivity : 0.22 µV typical at 12 dB SINAD
- Squelch sensitivity : 0.22 µV typical
- Adjacent channel selectivity : 70 dB typical
- Spurious response : 70 dB typical
- Intermodulation rejection ratio : 70 dB typical
- Hum and noise : 40 dB
- Audio output power (at 13.8 V DC) : 4.0 W typical at 10% distortion with an 4 Ω load
- Audio frequency responce : +2 dB to –8 dB of –6 dB octave from 300 Hz to 3000 Hz

All stated specifications are subject to change without notice or obligation.

■ VHF MARINE CHANNEL LIST

Channel No.			Frequency (MHz)		Channel No.			Frequency (MHz)		Channel No.			Frequency (MHz)	
USA	INT	CAN	Transmit	Receive	USA	INT	CAN	Transmit	Receive	USA	INT	CAN	Transmit	Receive
	01	01	156.050	160.650	21A		21A	157.050	157.050	73	73	73	156.675	156.675
01A			156.050	156.050		22		157.100	161.700	74	74	74	156.725	156.725
	02	02	156.100	160.700	22A		22A	157.100	157.100	77*[1]	77	77*[1]	156.875	156.875
	03	03	156.150	160.750		23	23	157.150	161.750		78		156.925	161.525
03A			156.150	156.150	23A			157.150	157.150	78A		78A	156.925	156.925
	04		156.200	160.800	24	24	24	157.200	161.800		79		156.975	161.575
		04A	156.200	156.200	25	25	25	157.250	161.850	79A		79A	156.975	156.975
	05		156.250	160.850	26	26	26	157.300	161.900		80		157.025	161.625
05A		05A	156.250	156.250	27	27	27	157.350	161.950	80A		80A	157.025	157.025
06	06	06	156.300	156.300	28	28	28	157.400	162.000		81		157.075	161.675
	07		156.350	160.950		60	60	156.025	160.625	81A		81A	157.075	157.075
07A		07A	156.350	156.350		61		156.075	160.675		82		157.125	161.725
08	08	08	156.400	156.400	61A		61A	156.075	156.075	82A		82A	157.125	157.125
09	09	09	156.450	156.450		62		156.125	160.725		83	83	157.175	161.775
10	10	10	156.500	156.500			62A	156.125	156.125	83A		83A	157.175	157.175
11	11	11	156.550	156.550		63		156.175	160.775	84	84	84	157.225	161.825
12	12	12	156.600	156.600	63A			156.175	156.175	84A			157.225	157.225
13*[2]	13	13*[1]	156.650	156.650		64	64	156.225	160.825	85	85	85	157.275	161.875
14	14	14	156.700	156.700	64A		64A	156.225	156.225	85A			157.275	157.275
15*[2]	15*[1]	15*[1]	156.750	156.750		65		156.275	160.875	86	86	86	157.325	161.925
16	16	16	156.800	156.800	65A	65A	65A	156.275	156.275	86A			157.325	157.325
17*[1]	17	17*[1]	156.850	156.850		66		156.325	160.925	87	87	87	157.375	161.975
	18		156.900	161.500	66A	66A	66A*[1]	156.325	156.325	87A			157.375	157.375
18A		18A	156.900	156.900	67*[2]	67	67	156.375	156.375	88	88	88	157.425	162.025
	19		156.950	161.550	68	68	68	156.425	156.425	88A			157.425	157.425
19A		19A	156.950	156.950	69	69	69	156.475	156.475					
20	20	20	157.000	161.600	70*[3]	70*[3]	70*[3]	156.525	156.525					
20A			157.000	157.000	71	71	71	156.575	156.575					
	21	21	157.050	161.650	72	72	72	156.625	156.625					

*[1] Low power only, *[2] Momentary high power, *[3] Receive only

NOTE: Channels 3, 21, 23, 61, 64, 81, 82 and 83 **CANNOT** be used by the general public in USA waters.

■ WX CHANNEL LIST

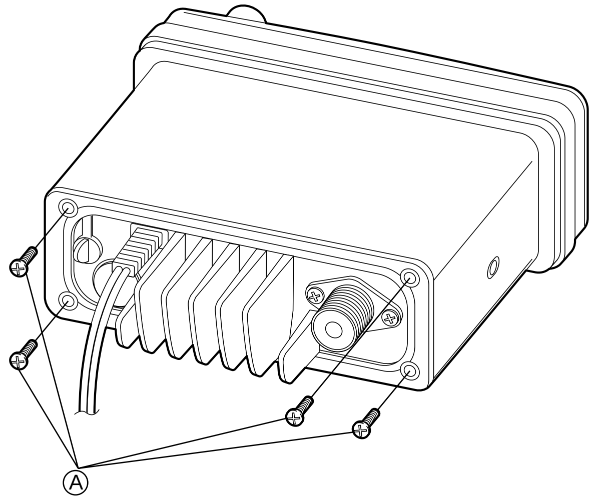
Weather channel	Frequency (MHz)		Weather channel	Frequency (MHz)	
	Transmit	Receive		Transmit	Receive
WX01	Receive only	162.550	WX06	Receive only	162.500
WX02	Receive only	162.400	WX07	Receive only	162.525
WX03	Receive only	162.475	WX08	Receive only	161.650
WX04	Receive only	162.425	WX09	Receive only	161.775
WX05	Receive only	162.450	WX10	Receive only	163.275

SECTION 2 DISASSEMBLY INSTRUCTIONS

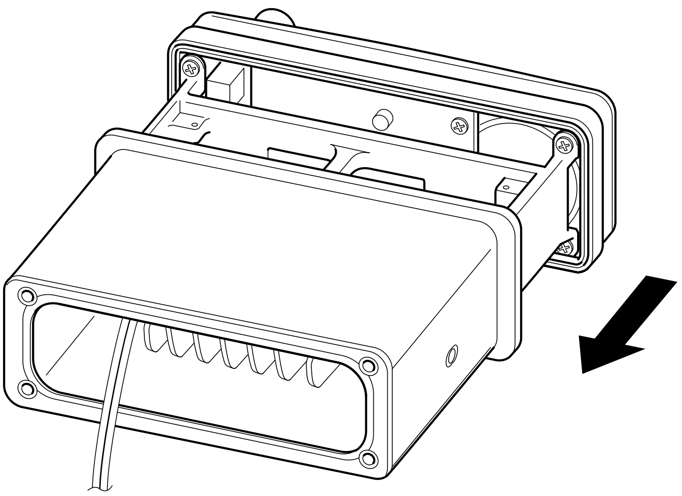
• REMOVING THE CASE

① Unscrew the 4 screws, Ⓐ.

Note: When replacing the screw, 10–12 kg of torque MUST be applied to ensure water resistance.



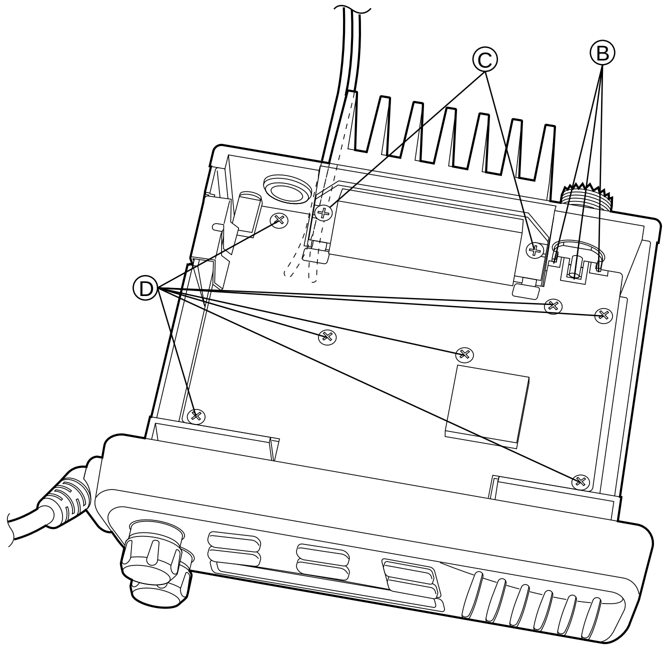
② Slide the case free of the chassis in the direction of the arrow.



• REMOVING THE MAIN UNIT

① Unsolder DC cable (2 points) and antenna connector, Ⓑ (3 points), as shown below.

② Unscrew 2 screws, Ⓒ, and 7 screws, Ⓓ, to remove the MAIN unit.



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

3-1-1 ANTENNA SWITCHING CIRCUIT

The antenna switching circuit functions as a low-pass filter while receiving and as resonator circuit while transmitting. The circuit does not allow transmit signals to enter receiver circuits.

Received signals enter the MAIN unit from the antenna connector and pass through the low-pass filter (L1–L3, C1–C5, C7). The signals are then applied to the RF circuit via the antenna switching circuit (D1, L4, L25).

3-1-2 RF CIRCUIT

The RF circuit amplifies signals within the range of frequency coverage and filters out-of-band signals.

The signals from the antenna switching circuit pass through a tunable bandpass filter (D2, L5) where the object signals are led to the RF amplifier circuit (Q1).

The amplified signals at Q1 are applied to the 2-stage tunable bandpass filter (D3, D4, L6, L7) to suppress unwanted signals and improve the selectivity. The signals are then applied to the 1st mixer circuit.

D2–D4 employ varactor diodes, that are controlled by the PLL lock voltage, to track the band pass filters.

3-1-3 1ST MIXER AND 1ST IF CIRCUITS

The 1st mixer circuit converts the received signal to a fixed frequency of the 1st IF signal with a 1st LO (VCO output) frequency. By changing the 1st LO frequency, only the desired frequency will be passed through a pair of crystal filters at the next stage of the mixer.

The signals from the RF circuit are mixed with the VCO signals at the 1st mixer circuit (Q2) to produce a 30.85 MHz 1st IF signal.

The 1st IF signal is applied to a pair of crystal filters (FI1) to suppress out-of-band signals and is then amplified at the IF amplifier (Q3). The amplified signal is applied to the 2nd mixer circuit (IC1).

3-1-4 2ND IF AND DEMODULATOR CIRCUITS

The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal. A double superheterodyne system (which converts receive signals twice) improves the image rejection ratio and obtains stable receiver gain.

The FM IF IC (IC1) contains the 2nd local oscillator, 2nd mixer, limiter amplifier, quadrature detector, and noise detector circuits, etc.

The 1st IF signal from Q3 is applied to the 2nd mixer section of IC1 (pin 16), and is mixed with a 30.4 MHz 2nd LO signal generated at the PLL circuit by doubling the reference frequency (15.2 MHz) to produce a 450 kHz 2nd IF signal.

The 2nd IF signal from IC1 (pin 3) is passed through the ceramic filter (FI2), where unwanted signals are suppressed, and is then applied to the 2nd IF and limiter amplifiers in IC1 (pin 5). The signal is applied to the FM detector section in IC1 for demodulation into AF signals.

The FM detector circuit employs a quadrature detection method (linear phase detection), which uses a ceramic discriminator (X2) for phase delay to obtain a non-adjusting circuit. The detected signal from IC1 (pin 9) is applied to the AF circuit.

3-1-5 AF AMPLIFIER CIRCUIT

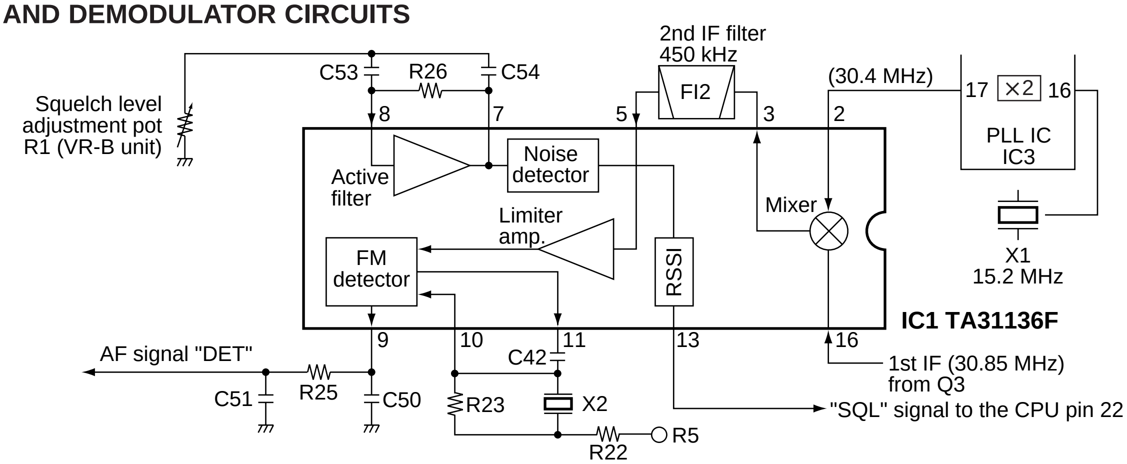
The AF amplifier circuit amplifies the detected signals to drive a speaker. The AF circuit includes an AF mute circuit for the squelch.

AF signals from IC1 (pin 9) are applied to the de-emphasis circuit (R92, C152). The de-emphasis circuit is an integrated circuit with frequency characteristic of –6 dB/octave.

The integrated signals are applied to the active filters (Q21, Q22). Q21 functions as a high-pass filter to suppress unwanted lower noise signals and Q22 functions as a low-pass filter to suppress higher noise signals.

The filtered signals are passed through the [VOLUME] control, and are then applied to the AF power amplifier (IC9, pin 1) via the analog switch (IC5, pins 4, 3). The output signal from IC9 (pin 4) drives the internal (external) speaker.

• 2ND IF AND DEMODULATOR CIRCUITS



3-1-6 SQUELCH CIRCUIT

A squelch circuit cuts out AF signals when no RF signals are received. By detecting noise components in the AF signals, the squelch circuit switches the AF mute switch.

A portion of the AF signals from the FM IF IC (IC1, pin 9) pass through the [SQUELCH] control pot, and are then applied to the active filter section (IC1, pin 8). The active filter section amplifies and filters noise components. The filtered signals are applied to the noise detector section and output from pin 13 as the “SQL” signal. The “SQL” signal is applied to the CPU (LOGIC unit; IC1, pin 22). The CPU analyzes the noise condition and outputs the RMUT signal via the I/O expander IC (IC7) to toggle the analog switches (IC5, pins 4, 3) as an AF mute switch.

3-1-7 WEATHER ALERT DECODER CIRCUIT [USA version only]

When the weather alert function is activated and a 1050 Hz alert tone from an NOAA weather radio broadcast is received, the IC-M45 emits beep tones and indicates flashing “ALT” on the display to inform of an emergency weather report on the air.

AF signals from the FM IF IC (IC1, pin 9) are applied to the tone decoder (IC10, pin 3). When a 1050 Hz signal is detected, the tone decoder outputs a low level signal from pin 8 and the output signals are applied to the CPU (LOGIC unit; IC1) to control beep tones and the “ALT” indicator.

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER CIRCUIT

The microphone amplifier circuit amplifies audio signals with +6 dB/octave pre-emphasis from the microphone to a level needed at the modulation circuit.

The AF signals from the microphone are amplified at the microphone amplifier (IC4). A capacitor (C135) and resistor (R114) are connected to the amplifier to obtain the pre-emphasis characteristics.

The amplified signals are applied to the IDC amplifier (IC6a, pin 2) via the analog switch (IC5, pins 8, 9) and are passed through the splatter filter (IC6b) to suppress unwanted 3 kHz or higher signals. The filtered signals are then applied to the modulation circuit.

3-2-2 MODULATION CIRCUIT

The modulation circuit modulates the VCO oscillating signal (RF signal) using the microphone audio signals.

Audio signals from the splatter filter (IC6b) pass through the frequency deviation adjustment pot (R130) and are then applied to the modulation circuit (D7) to change the reactance of D7, and modulate the oscillated signal at the TX-VCO (Q4).

3-2-3 DRIVE AMPLIFIER CIRCUIT

The drive amplifier circuit amplifies the VCO oscillating signal to a level needed at the power amplifier.

The VCO output is buffer-amplified by Q7 and Q9, and is then applied to the T/R switch (D9). The transmit signal from the T/R switch is amplified to the pre-drive (Q10) and drive (Q11) amplifiers to obtain an approximate 400 mW signal level. The amplified signal is then applied to the RF power amplifier (IC2).

3-2-4 POWER AMPLIFIER CIRCUIT

The power amplifier circuit amplifies the driver signal to an output power level.

IC2 is a power module which has amplification output capabilities of about 35 W. The output from IC2 (pin 4) is passed through the antenna switching circuit (D13) and is then applied to the antenna connector via the low-pass filter.

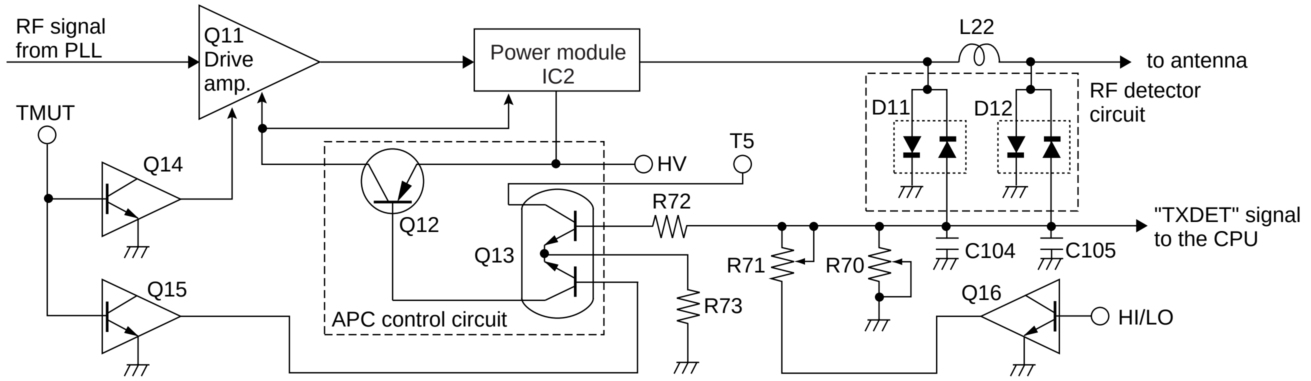
3-2-5 APC CIRCUIT

The APC circuit stabilizes transmit output power.

The RF output signal from the power amplifier (IC2) is detected at the power detector circuit (D11, D12, L22) and is then applied to one of the differential amplifier inputs (Q13, pin 5) via the High/Low control circuit (R70, R71, Q16). The applied voltage controls the differential amplifier output (Q17, pin 2) and the bias voltage control (Q12). Thus the APC circuit maintains a constant output power.

The reflected power from the antenna connector is detected at D12 and is then applied to the CPU. The detected voltage increases when the antenna is mismatched, causing the output power to be switched from High to Low to protect the power module (IC2).

• APC CIRCUIT



3-3 PLL CIRCUITS

3-3-1 GENERAL

The PLL circuit provides stable oscillation of the transmit frequency and receive 1st LO frequency. The PLL circuit compares the phase of the divided VCO frequency to the reference frequency. The PLL output frequency is controlled by a crystal oscillator and the divided ratio of the programmable divider. IC3 is a dual PLL IC which controls both VCO circuits for Tx and Rx.

The PLL circuit , using a one chip PLL IC (IC3), directly generates the transmit frequency and receive 1st IF frequency with VCOs. The PLL sets the divided ratio based on serial data from the CPU on the LOGIC unit and compares the phases of VCO signals with the reference oscillator frequency. The PLL IC detects the out-of-step phase and output from pins 8 and 13 for Tx and Rx, respectively. The reference frequency (15.2 MHz) is oscillated at X1.

3-3-2 TX LOOP

The generated signal at the TX-VCO (Q4, D6, D7) enters the PLL IC (IC3, pin 2) and is divided at the programmable divider section and is then applied to the phase detector section.

The phase detector compares the input signal with a reference frequency, and then outputs the out-of-phase signal (pulse-type signal) from pin 8.

The pulse-type signal is converted into DC voltage (lock voltage) at the loop filter (R41–R43, C75–C77), and then applied to varactor diodes (D6, D7) of the TX-VCO to stabilize the oscillated frequency.

3-3-3 RX LOOP

The generated signal at the RX-VCO (Q5, D8) enters the PLL IC (IC3, pin 19) and is divided at the programmable divider section and is then applied to the phase detector section.

The phase detector compares the input signal with a reference frequency, and then outputs the out-of-phase signal (pulse-type signal) from pin 13.

The pulse-type signal is converted into DC voltage (lock voltage) at the loop filter (R34, R37, R38, C64, C73), and then applied to varactor diode (D8) of the RX-VCO to stabilize the oscillated frequency. The lockvoltage is also used for the receiver circuit for the bandpass filter center frequency. The lock voltage from the loop filter is amplified at the buffer-amplifier (Q6) and then applied to the RF circuit.

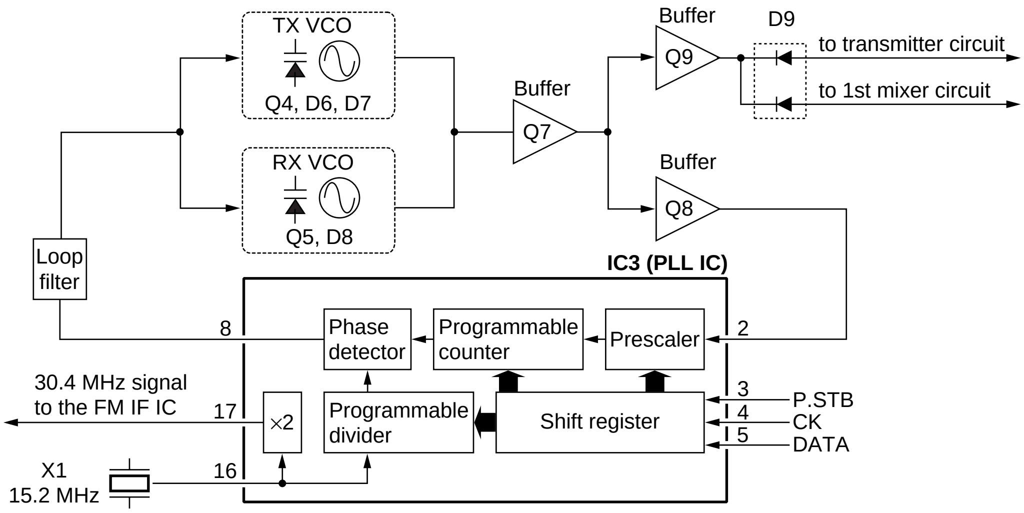
3-3-4 VCO CIRCUIT

The VCO outputs from Q4 (Tx) and Q5 (Rx) are buffer-amplified at Q7 and Q9, and are then sent to the T/R switch (D9). The receive LO signal is applied to the 1st mixer circuit (Q2) through a low-pass filter, and the transmit signal is applied to the pre-drive amplifier (Q10). A portion of the VCO output is reapplied to the PLL IC (IC10, pin 2 or pin 13) via Q8.

3-4 POWER SUPPLY CIRCUITS

LINE	DESCRIPTION
HV	The voltage from the connected DC power supply.
HVS	Same voltage as the HV line which is passed through the [PWR] switch (VR-A unit; R1).
5V	Common 5 V converted from the HVS line at the 5V regulator circuit (IC8).
R5	Receive 5 V converted from the 5V line at the R5 regulator circuit (Q19, Q20). The regulated voltage is applied to the receiver circuits.
T5	Transmit 5 V converted from the 5V line at the T5 regulator circuit (Q17, Q18).

• PLL CIRCUIT



3-5 PORT ALLOCATIONS

3-5-1 CPU (LOGIC unit; IC1)

Pin number	Port name	Description
3	LBATT	Input port for the connected power supply voltage detection (low voltage indicator).
5	PTT.M	Input port for the PTT switch.
6	TXDET	Input port for the “TX” indicator from the power detector circuit (Main unit; D11, D12).
7	SQLV	Input port for the squelch volume level.
8	KEY.M	Input port for the smart mic functions. 2.02 V: [UP] is pushed 3.00 V: [DN] is pushed 3.84 V: [HI/LO] is pushed
10	BEEP	Outputs beep audio signals.
13	OEX.STB	Outputs strobe signals for the output expander (MAIN unit; IC7).
14	P.STB	Outputs strobe signals for the PLL circuit.
15	DATA	Outputs data signals to the EEPROM (IC4), PLL IC (MAIN unit; IC3) and expander ICs (MAIN unit; IC7), etc.
16	CK	Outputs clock signal to the EEPROM (IC4), PLL IC (MAIN unit; IC3) and expander ICs (MAIN unit; IC7), etc.
17	ESI	Input port for the data signals from the EEPROM (IC4).
22	SQL	Input port from the FM IF IC (MAIN unit; IC1) for the squelch operation.
23	UNLK	Input port for the PLL unlock signal. Low : While PLL is locked.
24	TONE	Input port for the weather alert tone decode signal. Low : Weather alert tone (1050 Hz) is detected.
26, 27	LAMP2, LAMP1	Outputs LCD backlight control signal. High : While LCD backlight is ON.
31	HANG	Input port for the microphone hanger detection signal. Low : Microphone on hook
33	DOWN	Input port for the [DOWN] switch.
34	UP	Input port for the [UP] switch.
35	H/L	Input port for the [H/L] switch.
36	SCAN	Input port for the [SCAN] switch.
37	CH/WX	Input port for the [CH/WX] switch.
38	CH16/9	Input port for the [16/9] switch.

3-5-2 OUTPUT EXPANDER (MAIN unit; IC7)

Pin number	Port name	Description
4	RCV	Outputs the R5 regulator (Q19, Q20) control signal. Low : While receiving
5	SEND	Outputs the T5 regulator (Q17, Q18) control signal. Low : While transmitting
11	HI/LO	Output port fo RF output power (High or Low) select signal. Low : While low power is selected
12	OP.RST	Outputs the reset signal for optional unit via J5 (MAIN unit).
13	RMUT	Outputs the analog switch (IC5) control signal. Low : While squelched
14	TMUT	Outputs transmit mute signal. Low : While transmitting

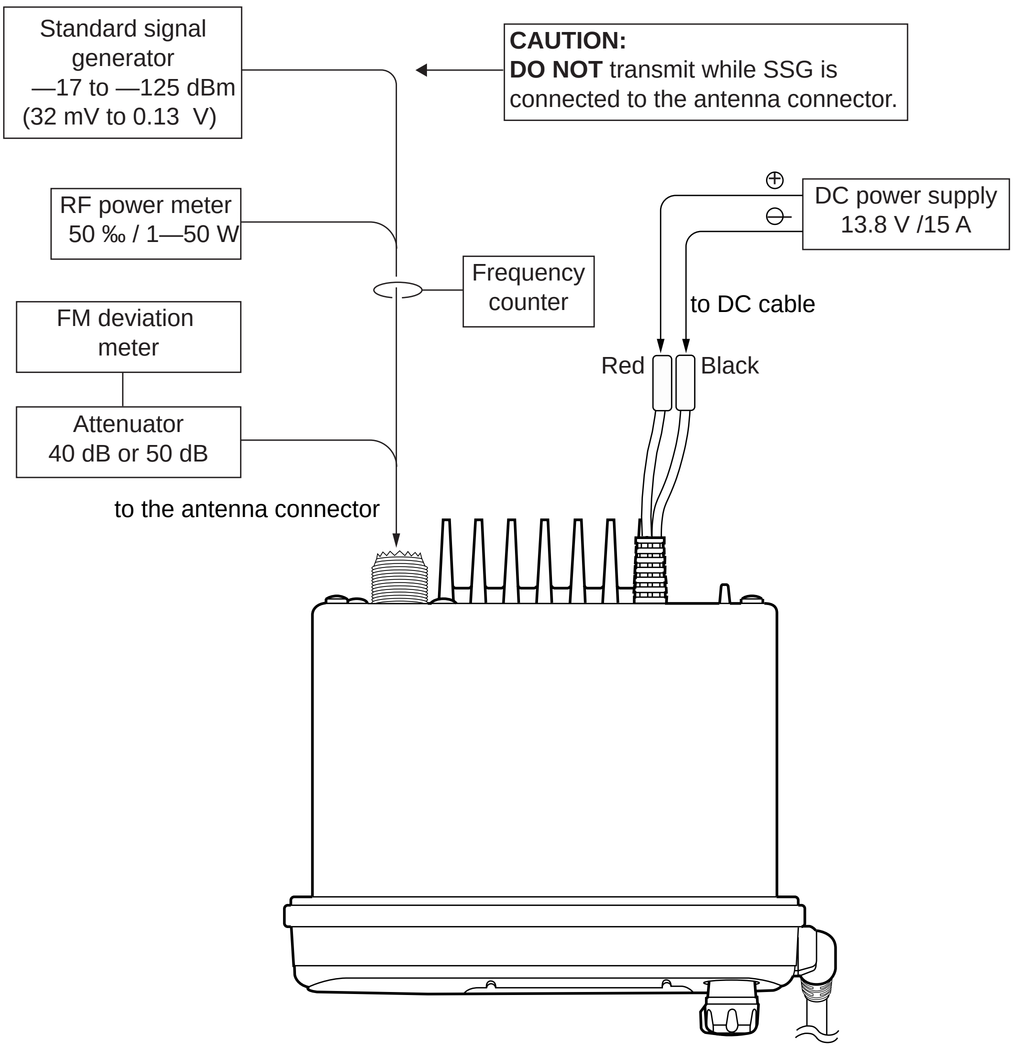
SECTION 4 ADJUSTMENT PROCEDURES

4-1 PREPARATION

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.8 V DC Current capacity : 10 A or more	Audio generator	Frequency range : 300–3000 Hz Measuring range : 1–500 mV
RF power meter (terminated type)	Measuring range : 1–50 W Frequency range : 100–300 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Standard signal generator (SSG)	Frequency range : 0.1–300 MHz Output level : 0.1 µV–32 mV (–127 to –17 dBm)
Frequency counter	Frequency range : 0.1–300 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–20 V
		AC millivoltmeter	Measuring range : 10 mV–10 V
FM deviation meter	Frequency range : 30–300 MHz Measuring range : 0 to ±10 kHz	External speaker	Input impedance : 4 Ω Capacity : 5 W or more
DC voltmeter	Input impedance : 50 kΩ/V DC or better	Attenuator	Power attenuation : 40 or 50 dB Capacity : 50 W or more

■ CONNECTIONS



4-2 PLL ADJUSTMENTS

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1	• Operating channel : ch16 • Receiving	MAIN	Connect a digital multi-meter or oscilloscope to the check point CP1.	2.6 V	MAIN	L13
	2	• Operating channel : ch16 • Output power : Low • Transmitting		Connect a digital multi-meter or oscilloscope to the check point CP2.	2.8 V		L12
REFERENCE FREQUENCY	1	• Operating channel : ch16 • Output power : Low • Connect an RF power meter or a 50 Ω dummy load to the antenna connector. • Transmitting	Rear Panel	Loosely couple the frequency counter to the antenna connector.	156.8000 MHz	MAIN	C117

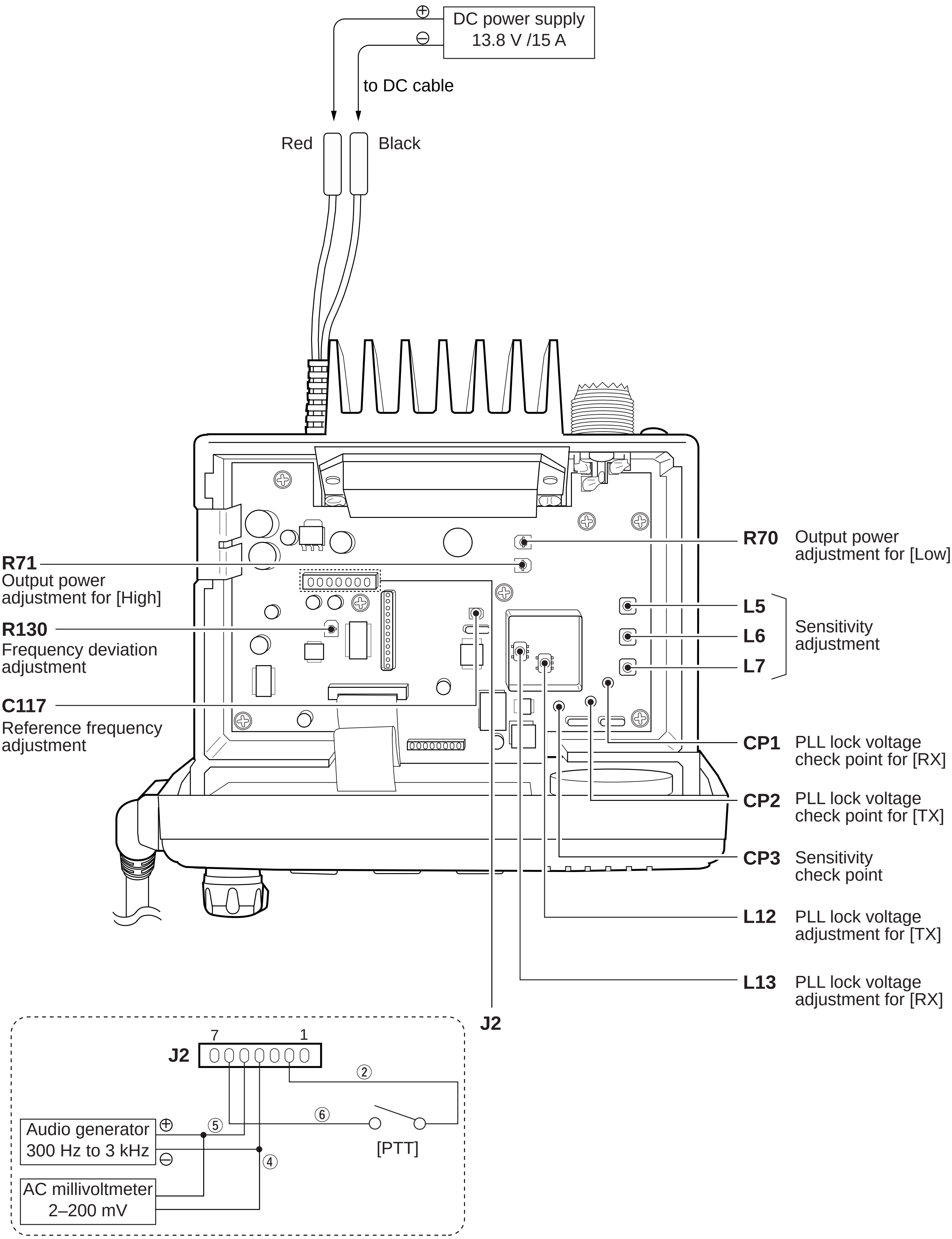
4-3 TRANSMITTER ADJUSTMENTS

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	• Operating channel : ch16 • Output power : Low • Transmitting	Rear Panel	Connect an RF power meter to the antenna connector.	0.7 W [M45EURO] 0.9 W [M45]	MAIN	R70
	2	• Output power : High • Transmitting			24 W[M45EURO] 25 W [M45]		R71
FREQUENCY DEVIATION	1	• Operating channel : ch16 • Output power : Low • Connect an audio generator to J2 (pin 5) with an AC millivoltmeter and set as: Frequency : 1 kHz Level : 230 mV [M45EURO] 550 mV [M45] • Set an FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P–P)/2 • Transmitting	Rear Panel	Connect an FM deviation meter to the antenna connector through an attenuator.	±4.3 kHz	MAIN	R130

4-4 RECEIVER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Operating channel : ch16 • [SQUELCH] control: Max. counterclockwise • Connect an SSG to the antenna connector and set as: Frequency : 156.800 MHz Level : 10 µV* (–97 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	MAIN	Connect a DC voltmeter to the check point CP3.	Maximum voltage	MAIN	L5, L6, L7

*This output level of a standard signal generator (SSG) is indicated as SSG's open circuit.


DC power supply
13.8 V /15 A
to DC cable
Red
Black
R70 Output power adjustment for [Low]
R71 Output power adjustment for [High]
L5
L6
L7
Sensitivity adjustment
R130 Frequency deviation adjustment
C117 Reference frequency adjustment
CP1 PLL lock voltage check point for [RX]
CP2 PLL lock voltage check point for [TX]
CP3 Sensitivity check point
L12 PLL lock voltage adjustment for [TX]
L13 PLL lock voltage adjustment for [RX]
J2
7
1
J2
②
⑥
⑤
④
Audio generator
300 Hz to 3 kHz
AC millivoltmeter
2–200 mV
[PTT]

SECTION 5 PARTS LIST

[LOGIC UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1530007220	S.IC	M38223M4-432-HP FX-2040
IC2	1110003500	S.IC	S-80742SL-A6-T1
IC3	1130007390	S.IC	TC7W02F (TE12L)
IC4	1140005620	S.IC	X25080SI-2.7T6
Q1	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q2	1510000500	S.TRANSISTOR	2SA1162-GR (TE85R)
Q3	1530001950	S.TRANSISTOR	2SC2712-GR (TE85R)
Q4	1590000670	S.TRANSISTOR	FMW1 T148
Q5	1520000450	S.TRANSISTOR	2SB1132 T100 Q
D1	1750000060	S.DIODE	1SS196 (TE85R)
D2	1750000110	S.DIODE	1SS272 (TE85R)
D3	1750000060	S.DIODE	1SS196 (TE85R)
D4	1750000060	S.DIODE	1SS196 (TE85R)
X1	6060000630	S.CERAMIC	PBRC 4.91 BR
R1	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R2	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R5	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R6	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R7	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R8	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R9	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R10	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R11	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R12	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R13	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R14	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R15	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R16	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R17	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R18	7030000190	S.RESISTOR	MCR10EZHJ 27 Ω (270)
R19	7030000190	S.RESISTOR	MCR10EZHJ 27 Ω (270)
R20	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R21	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R22	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R23	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R24	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R25	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R26	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R27	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R28	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R29	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R30	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R31	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R32	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R33	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R34	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C4	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C5	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C6	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C7	4030009660	S.CERAMIC	C1608 JF 1C 224Z-T-A
C8	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C9	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C10	4510005860	S.ELECTROLYTIC	ECEV1HA2R2SR
C11	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C12	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C13	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C14	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C15	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C16	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C17	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C18	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A

[LOGIC UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
C19	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C20	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C21	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
J1	6510019070	S.CONNECTOR	52559-3092
J2	6510018960	S.CONNECTOR	B2B-PH-SM3-TB
DS1	5030001373	LCD	LD-HU4549J-1 (E-4548-3)
DS2	5080000170	LAMP	HRS-7219A-Y2-30
DS3	5080000170	LAMP	HRS-7219A-Y2-30
W3	8900005320	FFC	OPC-519 (N:30 L:55)
EP1	0910049094	PCB	B 5035D
EP2	8930045650	LCD CONTACT	SRCN-2040-SP-N-W

[VR-A UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R1	7210001500	VARIABLE	RK097111102AA (10KA)
W1	8900007790	CABLE	OPC-759
EP1	0910049102	PCB	B 5036B

[VR-B UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R1	7210001010	VARIABLE	RK097111000AA (10KB)
EP1	0910049312	PCB	B 5055B

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION		
IC1	1110003490	S.IC	TA31136FN (D,EL)	
IC2	1150001540	IC	M57710-A/SC-1302	
IC3	1130007610	S.IC	µPD3140GS-E1 (DS8)	
IC4	1130007370	S.IC	TA75S558F (TE85L)	
IC5	1130007690	S.IC	BU4066BCF-T1	
IC6	1110003750	S.IC	M5218AFP 600C	
IC7	1130007700	S.IC	BU4094BCF-T1	
IC8	1180001070	S.IC	TA7805F (TE16L)	
IC9	1110003090	IC	LA4425A	
IC10	1110003640	S.IC	BA1604F-T	[USA] only
Q1	1560000550	S.FET	2SK882-Y (TE85R)	
Q2	1580000540	S.FET	3SK131-T2-LA	
Q3	1530002360	S.TRANSISTOR	2SC2714-Y (TE85R)	
Q4	1560000330	S.FET	2SK210-GR (TE85R)	
Q5	1560000330	S.FET	2SK210-GR (TE85R)	
Q6	1560000540	S.FET	2SK880-Y (TE85R)	
Q7	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)	

[USA]; IC-M45, [EUR]; IC-M45EURO

S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION		
Q8	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)	
Q9	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)	
Q10	1530002240	S.TRANSISTOR	2SC3775-3-TB	
Q11	1530002340	S.TRANSISTOR	2SC2954-T2B	
Q12	1520000380	TRANSISTOR	2SB1143 S	
Q13	1590000670	S.TRANSISTOR	FMW1 T148	
Q14	1590000420	S.TRANSISTOR	RN1404 (TE85R)	
Q15	1590000420	S.TRANSISTOR	RN1404 (TE85R)	
Q16	1590000460	S.TRANSISTOR	RN1402 (TE85R)	
Q17	1590000420	S.TRANSISTOR	RN1404 (TE85R)	
Q18	1520000460	S.TRANSISTOR	2SB1132 T100 R	
Q19	1590000420	S.TRANSISTOR	RN1404 (TE85R)	
Q20	1520000460	S.TRANSISTOR	2SB1132 T100 R	
Q21	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)	
Q22	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)	
Q23	1540000550	S.TRANSISTOR	2SD1664 T100Q	
Q24	1590001190	S.TRANSISTOR	XP6501-(TX) .AB	[USA] only
Q25	1520000460	S.TRANSISTOR	2SB1132 T100 R	[USA] only
D1	1710001080	DIODE	XB15A308	
D2	1720000370	S.VARICAP	HVU350TRF	
D3	1720000370	S.VARICAP	HVU350TRF	
D4	1720000370	S.VARICAP	HVU350TRF	
D5	1750000470	S.DIODE	1SS321 (TE85R)	
D6	1790000640	S.VARICAP	MA363B (TX)	
D7	1790000640	S.VARICAP	MA363B (TX)	
D8	1790000640	S.VARICAP	MA363B (TX)	
D9	1790000450	S.DIODE	MA862 (TX)	
D10	1750000060	S.DIODE	1SS196 (TE85R)	
D11	1790000690	S.DIODE	HSM88ASR-TR	
D12	1790000690	S.DIODE	HSM88ASR-TR	
D13	1710000290	DIODE	MI308	
D14	1750000060	S.DIODE	1SS196 (TE85R)	[EUR] only
D15	1730000730	S.ZENER	RD6.2M-T2B2	[EUR] only
D16	1750000070	S.DIODE	1SS226 (TE85R)	
D17	1790000700	DIODE	DSA3A1	
D18	1790000640	S.VARICAP	MA363B (TX)	
D19	1790000640	S.VARICAP	MA363B (TX)	
FI1	2010001610	MONOLITH	FL-202 (30.850 MHz)	
FI2	2020001210	CERAMIC	CFWS450E	
X1	6050009640	XTAL	CR-528 (15.2 MHz)	
X2	6070000210	S.DISCRIMINATOR	CDBCA450CX24	
L1	6110001670	COIL	LA-253	
L2	6110001600	COIL	LA-243	
L3	6110001130	COIL	LA-149	
L4	6110001600	COIL	LA-243	
L5	6150004360	S.COIL	LS-491	
L6	6150004360	S.COIL	LS-491	
L7	6150004360	S.COIL	LS-491	
L8	6200004790	S.COIL	MLF1608D R47K-T	
L9	6200002430	S.COIL	NL 252018T-082J	
L10	6200003320	S.COIL	NL 322522T-3R3J-3	
L11	6200003100	S.COIL	NL 322522T-3R9J-3	
L12	6130002370	S.COIL	LB-258	
L13	6130002360	S.COIL	LB-257	
L14	6200003090	S.COIL	NL 322522T-2R7J-3	
L15	6200003090	S.COIL	NL 322522T-2R7J-3	
L16	6200004700	S.COIL	MLR1608M R10K-T	
L17	6200004700	S.COIL	MLR1608M R10K-T	
L18	6200004700	S.COIL	MLR1608M R10K-T	
L19	6200002430	S.COIL	NL 252018T-082J	
L20	6200002430	S.COIL	NL 252018T-082J	
L21	6170000230	COIL	LW-25	
L22	6110001600	COIL	LA-243	
L23	6200004660	S.COIL	MLF1608A 1R8K-T	
L24	6200004660	S.COIL	MLF1608A 1R8K-T	
L25	6110001580	COIL	LA-238	
L26	6200002600	S.COIL	NL 252018T-047J	
R1	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)	
R2	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)	
R3	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)	
R4	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)	
R5	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)	

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R6	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R7	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R8	7030003790	S.RESISTOR	ERJ3GEYJ 824 V (820 kΩ)
R9	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R10	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R11	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R12	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R13	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R14	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R15	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R17	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R18	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R19	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R20	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R21	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R22	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R23	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R24	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R25	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R26	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R27	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R28	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R29	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R30	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R31	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R32	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R33	7030003310	S.RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R34	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R35	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R36	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R37	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R38	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R39	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R40	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R41	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R42	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R43	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R44	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R45	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R46	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R47	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R48	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R49	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R50	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R51	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R52	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R53	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R54	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R55	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R56	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R57	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R58	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R59	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R60	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R61	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R62	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R63	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R64	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R65	7030000240	S.RESISTOR	MCR10EZHJ 68 Ω (680)
R66	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R67	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R68	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R69	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R70	7310002740	S.TRIMMER	RV-150 (RH03A3A14X0FC) 103
R71	7310002670	S.TRIMMER	RV-143 (RH03A3AS2) 471
R72	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R73	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R74	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R75	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R76	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R77	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R78	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R79	7410000990	S.ARRAY	EXB-V8V 470JV
R80	7410000990	S.ARRAY	EXB-V8V 470JV
R81	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R82	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R83	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R84	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R85	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R86	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R87	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R88	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)

[USA]; IC-M45, [EUR]; IC-M45EURO

S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R89	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R90	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R91	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R92	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R93	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R94	7030003770	S.RESISTOR	ERJ3GEYJ 564 V (560 kΩ)
R95	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R96	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R97	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R98	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R99	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R100	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R101	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R102	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R103	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R104	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R105	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R106	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R107	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R108	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R109	7030000100	S.RESISTOR	MCR10EZHJ 4.7 Ω (4R7)
R111	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R112	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R113	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R114	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R115	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ) [USA]
	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ) [EUR]
R116	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R117	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R118	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R119	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R120	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R122	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R123	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R124	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R125	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R126	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R127	7510000750	S.THERMISTOR	NTCCS2012 3NH 103KC-T
R128	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R129	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R130	7310002600	S.TRIMMER	RV-110 (RH03A3AS4X0AA) 473
R131	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R132	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R133	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R134	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R135	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ) [USA] only
R136	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ) [USA] only
R137	7030007590	S.RESISTOR	RR0816R-433-D (43 kΩ) [USA] only
R138	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R139	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R140	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R141	7030000240	S.RESISTOR	MCR10EZHJ 68 Ω (680)
R142	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R143	7030001070	S.RESISTOR	MCR50JZHJ 33 Ω (330)
R144	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R145	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R146	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R147	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R148	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R149	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R150	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R151	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R152	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ) [USA] only
R153	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ) [USA] only
R154	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R155	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R156	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R157	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
C1	4030011160	S.CERAMIC	GRM42-6 CH 150J 500PT
C2	4030011110	S.CERAMIC	GRM42-6 CH 090D 500PT
C3	4030011290	S.CERAMIC	GRM42-6 CH 240J 500PT
C4	4030011070	S.CERAMIC	GRM42-6 CH 050C 500PT
C5	4030011160	S.CERAMIC	GRM42-6 CH 150J 500PT
C7	4030011100	S.CERAMIC	GRM42-6 CH 080D 500PT
C8	4030011260	S.CERAMIC	GRM42-6 W5R 102K 500PT

[USA]; IC-M45, [EUR]; IC-M45EURO

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
C9	4030011190	S.CERAMIC	GRM42-6 CH 270J 500PT
C10	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C11	4030011220	S.CERAMIC	GRM42-6 CH 360J 500PT
C12	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C13	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C14	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C15	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C16	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C17	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4030009920	S.CERAMIC	C1608 CH 1H 050B-T-A
C19	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C20	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C21	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C23	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C24	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C25	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C26	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C28	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C29	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C30	4030007110	S.CERAMIC	C1608 CH 1H 680J-T-A
C31	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C32	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C33	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C34	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C35	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C36	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C37	4030009660	S.CERAMIC	C1608 JF 1C 224Z-T-A
C38	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C39	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C40	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C41	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C42	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C43	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C44	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C45	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C46	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C47	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C50	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C51	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C52	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C53	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C54	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C55	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C56	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C57	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C58	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C59	4550006250	S.TANTALUM	TEMSVA 1A 106M-8L
C61	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C62	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C63	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C64	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C65	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C67	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C68	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C69	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C70	4550006250	S.TANTALUM	TEMSVA 1A 106M-8L
C71	4030009560	S.CERAMIC	C1608 CH 1H R75B-T-A
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C74	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C75	4550000730	S.TANTALUM	TESVA 0J 225M1-8L
C76	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C77	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C78	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C79	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C80	4030009920	S.CERAMIC	C1608 CH 1H 050B-T-A
C81	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C82	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C83	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C84	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C85	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C88	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C89	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C90	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C91	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C92	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C94	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C95	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A

S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION		
C96	4550002830	S.TANTALUM	TESVD2 1V 685M-12R	
C97	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C98	4510004590	ELECTROLYTIC	16 MV 470 HC	
C99	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C100	4030011290	S.CERAMIC	GRM42-6 CH 240J 500PT	
C101	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C102	4030011170	S.CERAMIC	GRM42-6 CH 180J 500PT	
C103	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C104	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C105	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C106	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C107	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C108	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A	
C109	4510004440	S.ELECTROLYTIC	ECEV1HA010SR	
C110	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C111	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A	
C112	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C113	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A	
C114	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C115	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C116	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A	
C117	4610002150	S.TRIMMER	CTZ3S-10A-W1-AF	
C118	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A	
C119	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C120	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A	
C121	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A	
C122	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A	
C123	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A	
C124	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A	
C125	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C126	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C127	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C128	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C129	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C130	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C131	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C132	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	[EUR] only
C133	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C134	4030008770	S.CERAMIC	C1608 JB 1H 562K-T-A	
C135	4550000510	S.TANTALUM	TESVA 1V 473M1-8L	
C136	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C137	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C138	4030008650	S.CERAMIC	C1608 JB 1H 332K-T-A	
C139	4030007110	S.CERAMIC	C1608 CH 1H 680J-T-A	
C140	4030008470	S.CERAMIC	C1608 JB 1H 272K-T-A	
C141	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C142	4510004630	S.ELECTROLYTIC	ECEV1CA100SR	
C143	4510004630	S.ELECTROLYTIC	ECEV1CA100SR	
C144	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C145	4510004630	S.ELECTROLYTIC	ECEV1CA100SR	
C146	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A	
C147	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A	
C148	4510005320	S.ELECTROLYTIC	ECEV0JA101SP	
C149	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C150	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C151	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A	
C152	4550006130	S.TANTALUM	ECST1VY224R	
C153	4030008890	S.CERAMIC	C1608 JB 1C 273K-T-A	
C154	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A	
C155	4030009490	S.CERAMIC	C1608 JB 1H 821K-T-A	
C156	4510004630	S.ELECTROLYTIC	ECEV1CA100SR	
C157	4550006150	S.TANTALUM	ECST1CY105R	
C158	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C159	4550006130	S.TANTALUM	ECST1VY224R	
C160	4550006170	S.TANTALUM	ECST1AY225R	
C161	4550006170	S.TANTALUM	ECST1AY225R	
C162	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A	
C163	4510004590	ELECTROLYTIC	16 MV 470 HC	
C164	4510004590	ELECTROLYTIC	16 MV 470 HC	
C165	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A	
C166	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C167	4510004630	S.ELECTROLYTIC	ECEV1CA100SR	[USA] only
C168	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	[USA] only
C169	4550006170	S.TANTALUM	ECST1AY225R	[USA] only
C170	4550006150	S.TANTALUM	ECST1CY105R	[USA] only
C171	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	[USA] only
C172	4340000010	S.MYLAR	ECWU 1C 223JB5	[USA] only
C174	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C175	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A	
C176	4030011340	S.CERAMIC	C1608 CH 1H 471J-T-A	
C177	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A	
C178	4030011730	S.CERAMIC	GRM42-6 CH 101J 500PT	

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION		
C179	4030008890	S.CERAMIC	C1608 JB 1C 273K-T-A	
C180	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C181	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C182	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C183	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C184	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C185	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C186	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C187	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C188	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C189	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C190	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C191	4510005900	S.ELECTROLYTIC	ECEV0GA101SR	
C192	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C193	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C194	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C195	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C196	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C197	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A	
C198	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	[USA] only
C199	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C200	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C201	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C202	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A	
C203	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A	
C204	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A	
C205	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A	
C206	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A	
J1	6510019420	S.CONNECTOR	B8B-ZR-SM3-TF	
J2	6510003430	CONNECTOR	B07B-EH-S	
J3	6450001060	CONNECTOR	HSJ1493-01-010	
J4	6510019070	S.CONNECTOR	52559-3092	
J5	6510019250	S.CONNECTOR	B11B-ZR-SM3-TF	
W1	7120000470	JUMPER	ERDS2T0	
W2	7120000470	JUMPER	ERDS2T0	
EP1	0910049084	PCB	B 5034D	
EP2	9040902902	TUBE	IRRAX 0.7 (d) L=2 mm	

[USA]; IC-M45, [EUR]; IC-M45EURO

S.=Surface mount

SECTION 6 MECHANICAL PARTS AND DISASSEMBLY

[CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510004880	Connector MR-DSE-01	1
MC1	0800004370	Microphone HM-117B [Black]	1
	0800004380	Microphone HM-117W [White]	1
SP1	2510001040	Speaker F45G07-4	1
W1	8900007770	Cable OPC-754 [USA]	1
	8900007930	Cable OPC-773 [EUR]	1
MP2	8010017264	2040 Chassis-4	1
MP3	8930045700	2040 IC clip	1
MP4	8510011530	2040 Case [U-Black]	1
	8510011550	2040 Case (A) [U-White]	1
	8510011880	2040 Case (B) [E-White]	1
	8510012510	2040 Case (C) [E-Black]	1
MP5	8210015210	2040 Front panel [U-Black]	1
	8210015260	2040 Front panel (A) [U-White]	1
	8210015510	2040 Front panel (B) [E-White]	1
	8210016230	2040 Front panel (C) [E-Black]	1
MP6	8930045260	2040 6-KEY [USA]	1
	8930046650	2040 6-KEY (A) [EUR]	1
MP7	8930045270	2040 R-packing	1
MP8	8930045280	2040 F-packing	1
MP10	8610010550	Knob N-264 [Black]	2
	8610010580	Knob N-264 (A) [White]	2
MP12	8930033470	1542 Jack bush	1
MP13	8930045290	2040 Bush plate	1
MP15	8930014280	SP net	1
MP16	8810008630	Screw PH B0 M3x6 NI-ZU (BT)	7
MP17	8810008660	Screw PH B0 M3x8 NI-ZU (BT)	4
MP18	8810008660	Screw PH B0 M3x8 NI-ZU (BT)	2
MP19	8810004540	Screw BiH M3x8 SUS	2
MP20	8810004540	Screw BiH M3x8 SUS	4
MP21	8810008680	Screw PH M3x8 NI	4

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
DS1	5030001373	LCD LD-HU4549J-1	1
DS2	5080000170	Lamp HRS-7219A-Y2 30	1
DS3	5080000170	Lamp HRS-7219A-Y2 30	1
W3	8900005320	FFC OPC-519	1
EP2	8930045650	LCD contact SRCN-2040-SP-N-W	1
MP1	8210015200	2040 Reflector	1
MP2	8930045300	2040 LCD holder	1

[VR-A UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
R1	7210001500	Variable resistor RK097111102AA (10KA) [PWR/VOL] (incl. nut)	1

[VR-B UNIT]

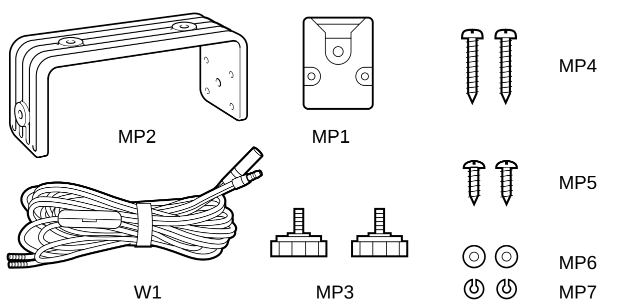
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
R1	7210001010	Variable resistor RK097111000AA (10KB) [SQUELCH] (incl. nut)	1

[MAIN UNIT]

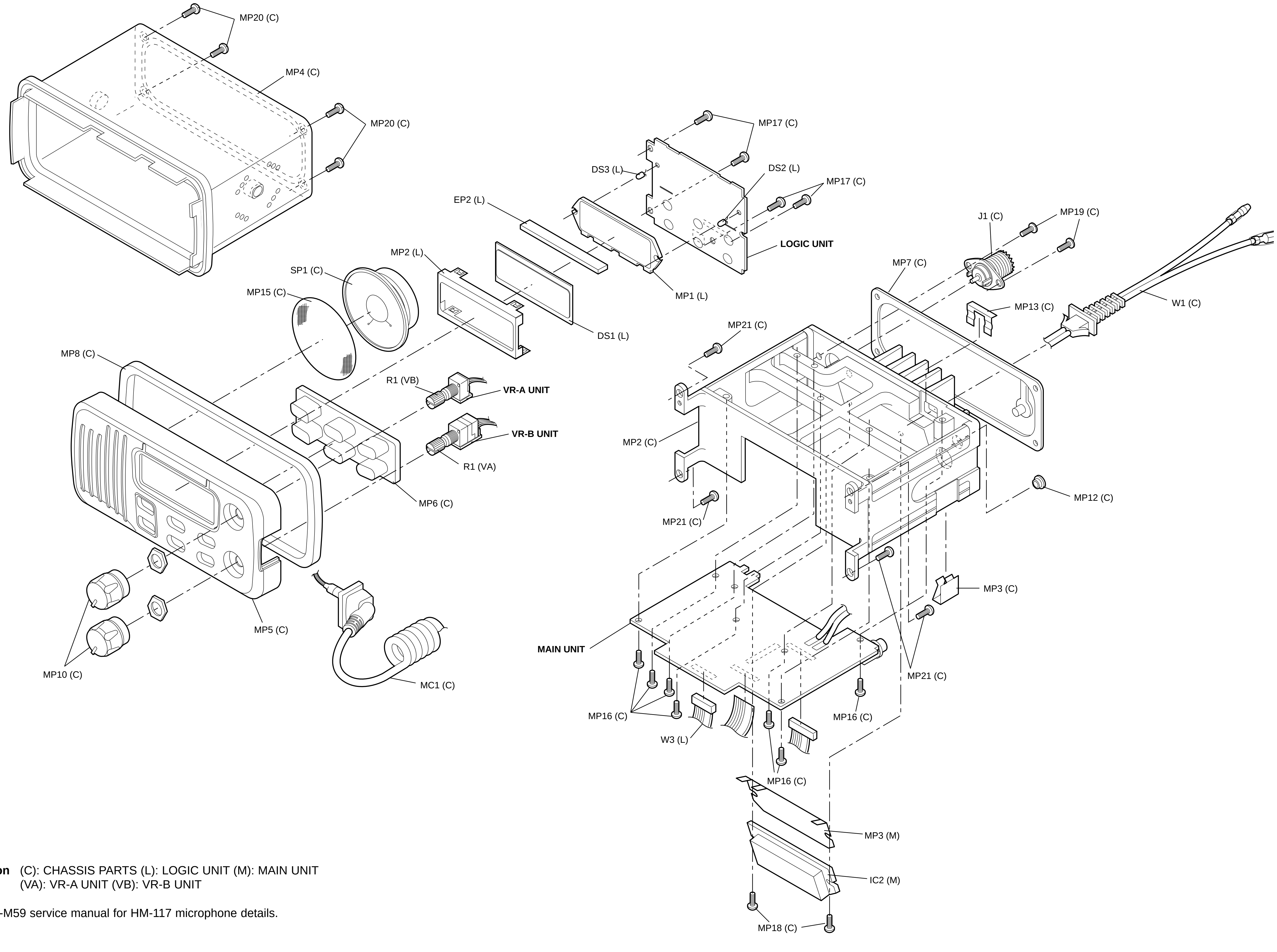
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8510011600	2040 VCO Case	1
MP2	8510011590	2040 VCO Cover	1
MP3	8510011690	2040 Module plate [USA]	1
	8510011860	2040 A-Module plate [EUR]	1

[ACCESSORIES]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
W1	8900006540	Cable OPC-632	1
MP1	8950004140	1632 MIC hanger [U-Black] only	1
	8950004770	1632 MIC hanger (A) [U-White] only	1
MP2	8010017250	2040 Mobile bracket [Black]	1
	8010017270	2040 Mobile bracket (A) [White]	1
MP3	8610010560	2040 Knob bolt [Black]	2
	8610010590	2040 Knob bolt (A) [White]	2
MP4	8810001470	Screw PH A0 M3.5x30 SUS	2
MP5	8810001490	Screw PH A0 M5x20 SUS	2
MP6	8850000180	Flat washer M5 SUS	2
MP7	8850000500	Spring washer M5 SUS	2



Screw abbreviations
A, B0, BT: Self-tapping
PH: Pan head
FH: Flat head
BiH: Bind head
NI: Nickel
SUS: Stainless
ZK: Black

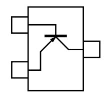
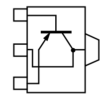
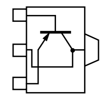
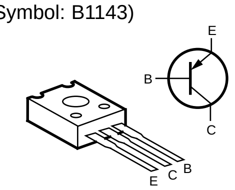
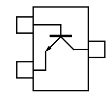
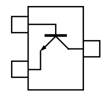
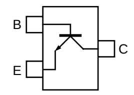
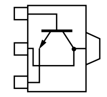
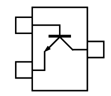
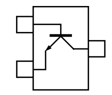
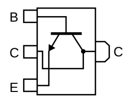
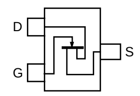
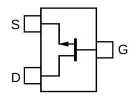
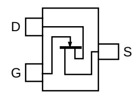
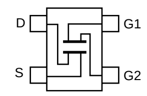
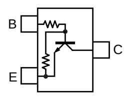
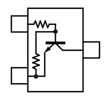
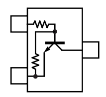
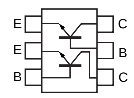


UNIT abbreviation (C): CHASSIS PARTS (L): LOGIC UNIT (M): MAIN UNIT
(VA): VR-A UNIT (VB): VR-B UNIT

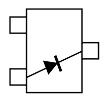
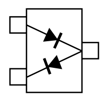
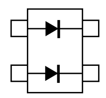
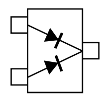
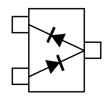
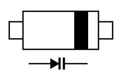
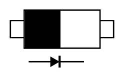
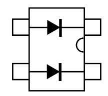
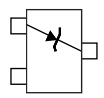
Note: Refer to IC-M59 service manual for HM-117 microphone details.

SECTION 7 SEMI-CONDUCTOR INFORMATION

• TRANSISTOR AND FET'S

2SA1162 GR (Symbol: SR) 	**2SB1132 Q** (Symbol: BAQ) 	**2SB1132 R** (Symbol: BAR) 	**2SB1143 S** (Symbol: B1143) 	**2SC2712 GR** (Symbol: LG) 
2SC2712 Y (Symbol: LY) 	**2SC2714 Y** (Symbol: QY) 	**2SC2954** (Symbol: QK) 	**2SC3775 3** (Symbol: OY3) 	**2SC4215 O** (Symbol: QO) 
2SD1664 Q (Symbol: DA) 	**2SK210 GR** (Symbol: YG) 	**2SK880 Y** (Symbol: XY) 	**2SK882 Y** (Symbol: TY) 	**3SK131 L** (Symbol: V12) 
FMW1 (Symbol: W1) 	**RN1402** (Symbol: XB) 	**RN1404** (Symbol: XD) 	**XP6501 AB** (Symbol: 5N) 	

• DIODES

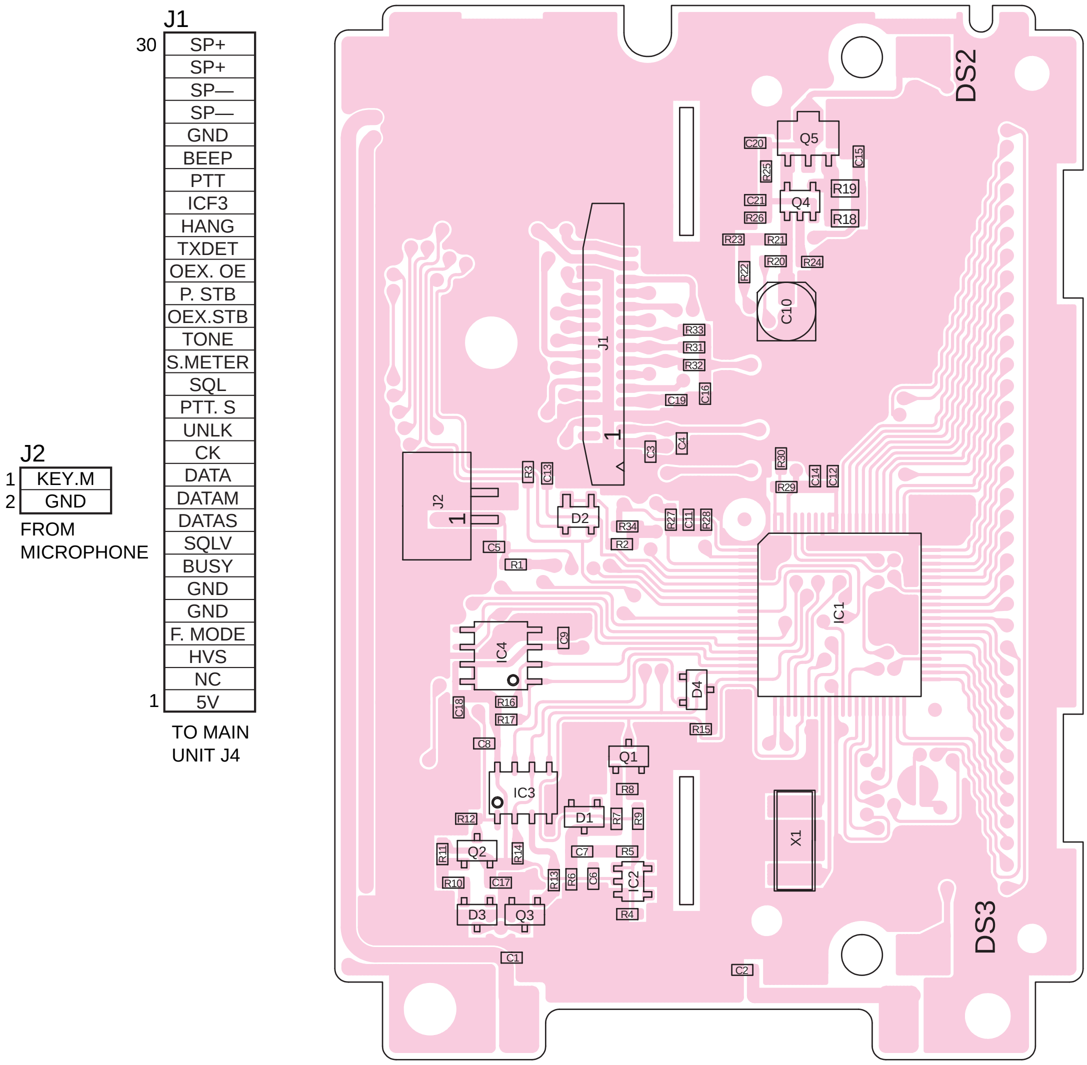
1SS196 (Symbol: G3) 	**1SS226** (Symbol: C3) 	**1SS272** (Symbol: A1) 	**1SS321** (Symbol: F9) 	**HSM88ASR** (Symbol: C3) 
HVU350 (Symbol: 4) 	**MA363 B** (Symbol: 6D) 	**MA862** (Symbol: M1I) 	**RD6.2M B2** (Symbol: 622) 	

SECTION 8 BOARD LAYOUTS

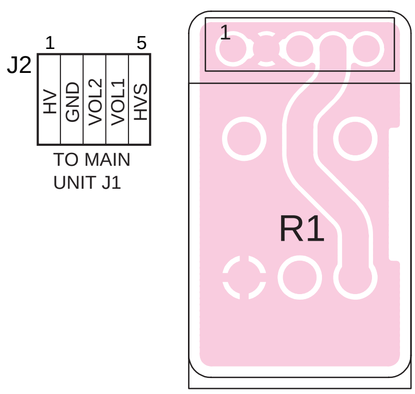
8-1 LOGIC, VR-A AND VR-B UNITS

8-1-1 TOP VIEW

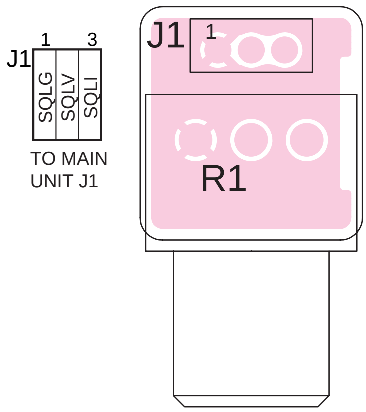
• **LOGIC UNIT**



• **VR-A UNIT**

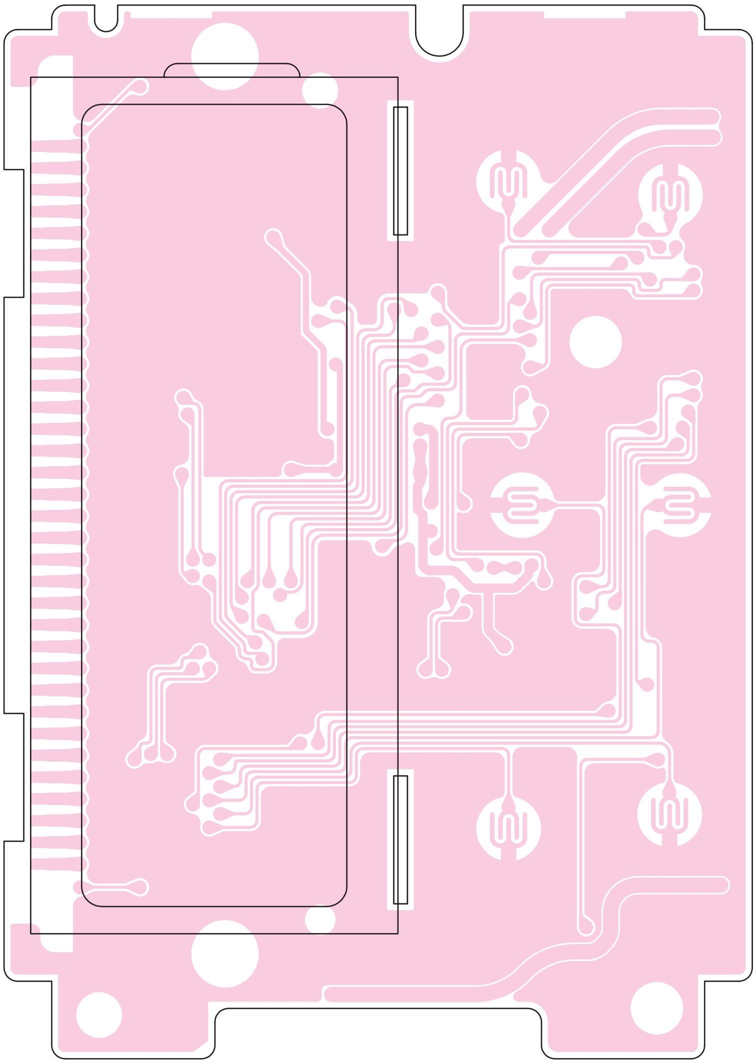


• **VR-B UNIT**

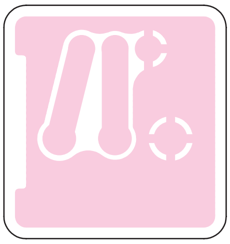


8-1-2 BOTTOM VIEW

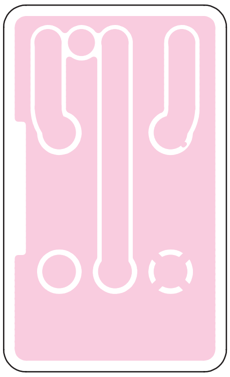
• LOGIC UNIT



• VR-B UNIT

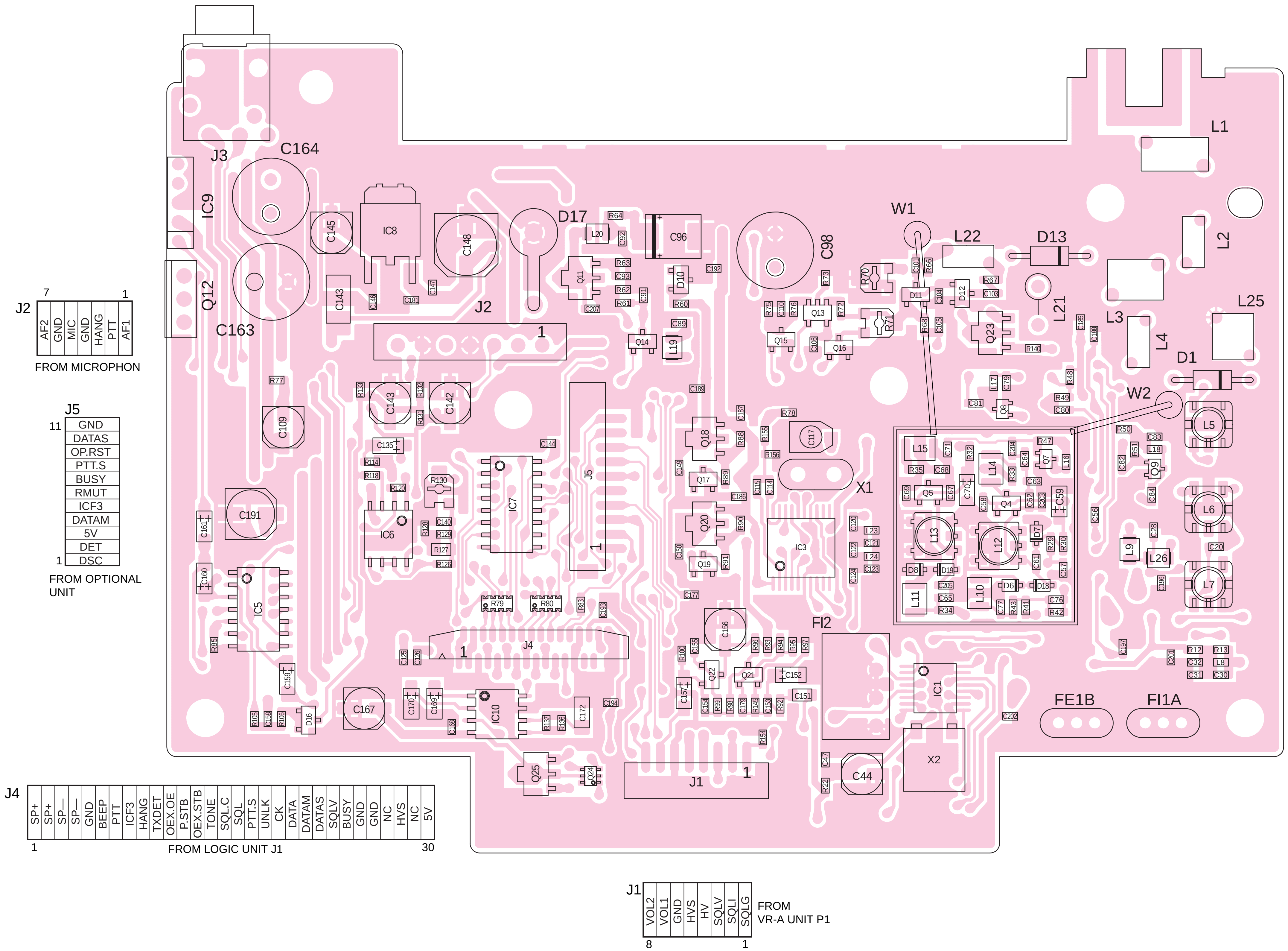


• VR-A UNIT

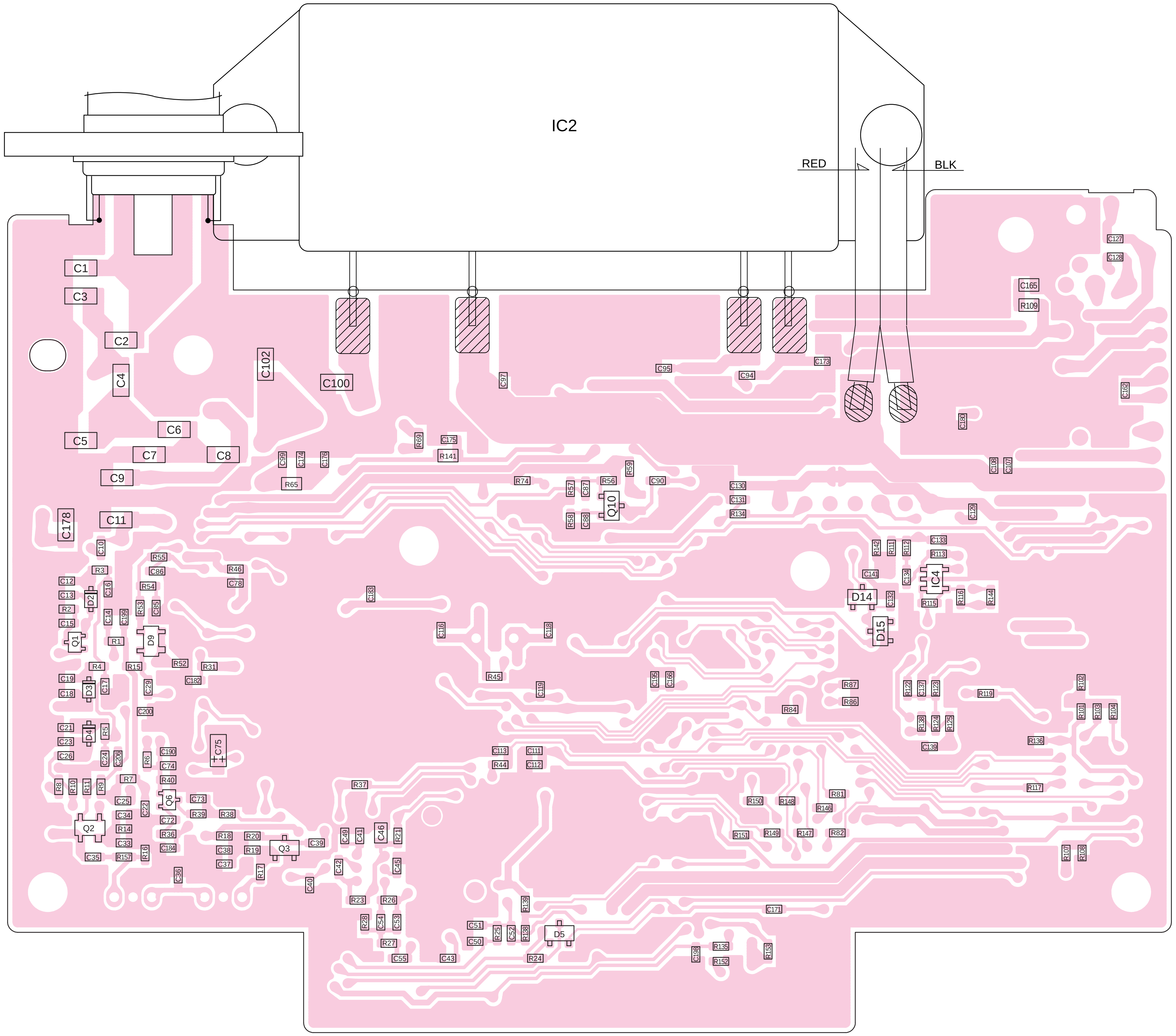


8-2 MAIN UNIT

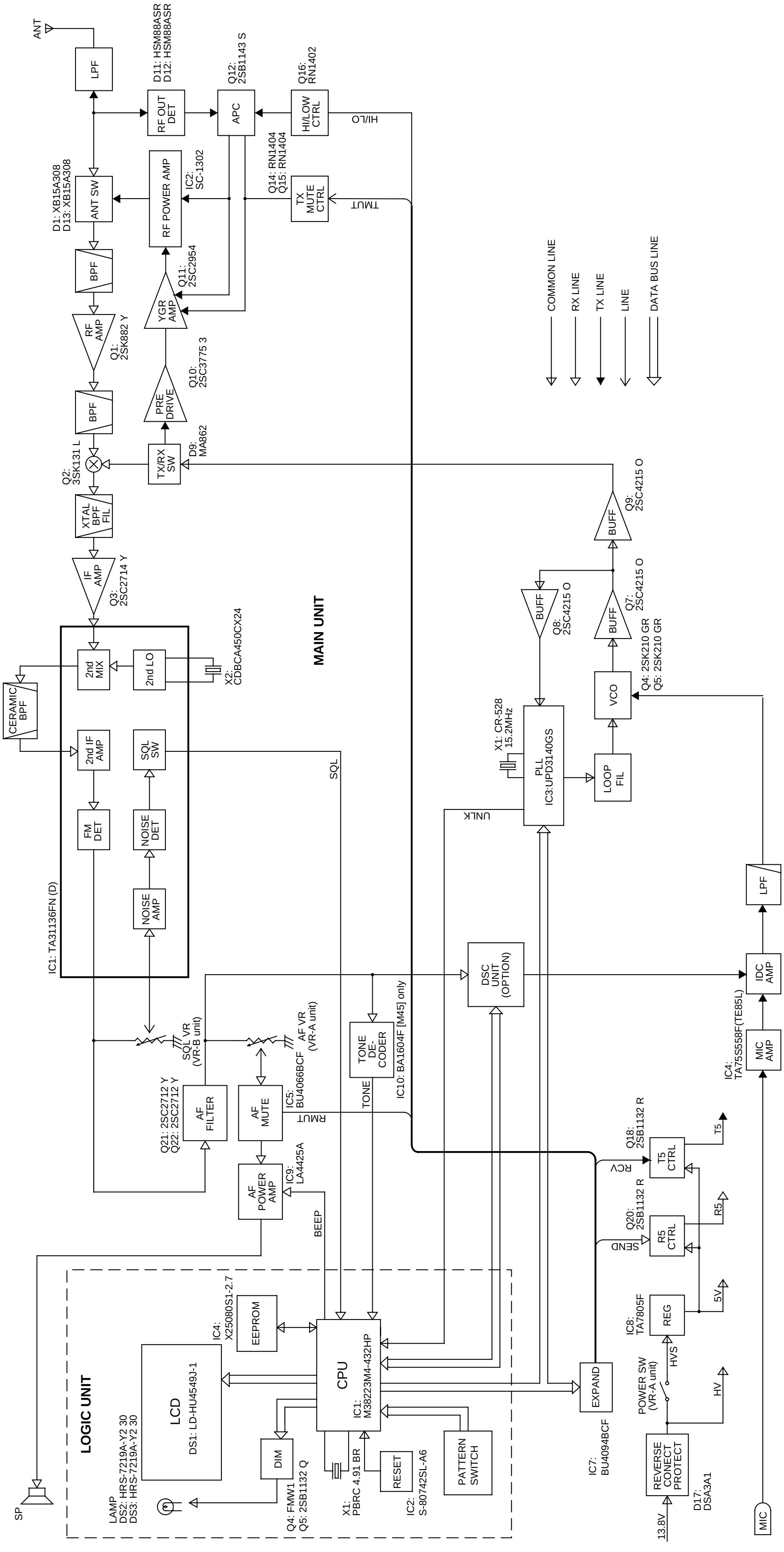
• TOP VIEW



• **BOTTOM VIEW**

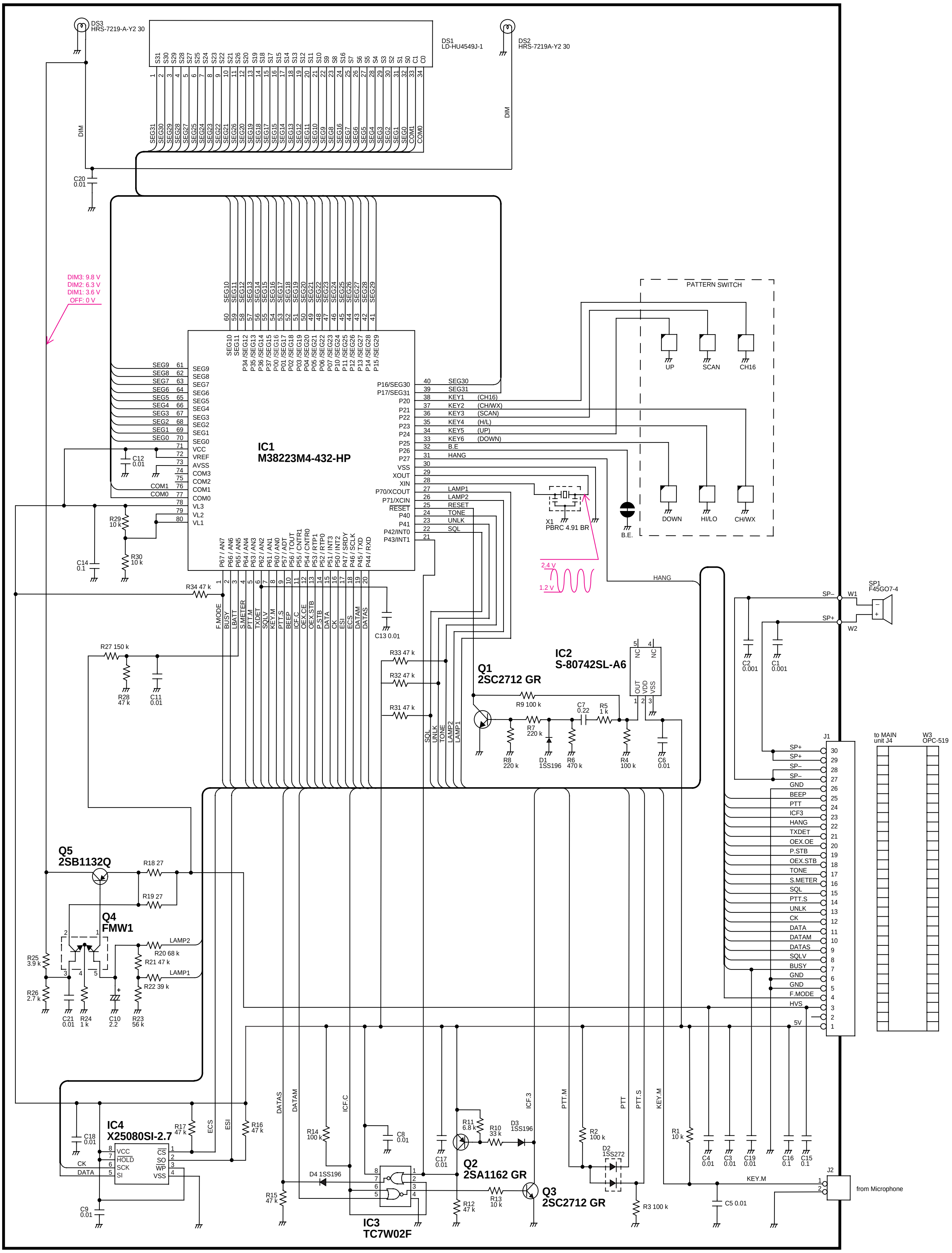


SECTION 9 BLOCK DIAGRAM

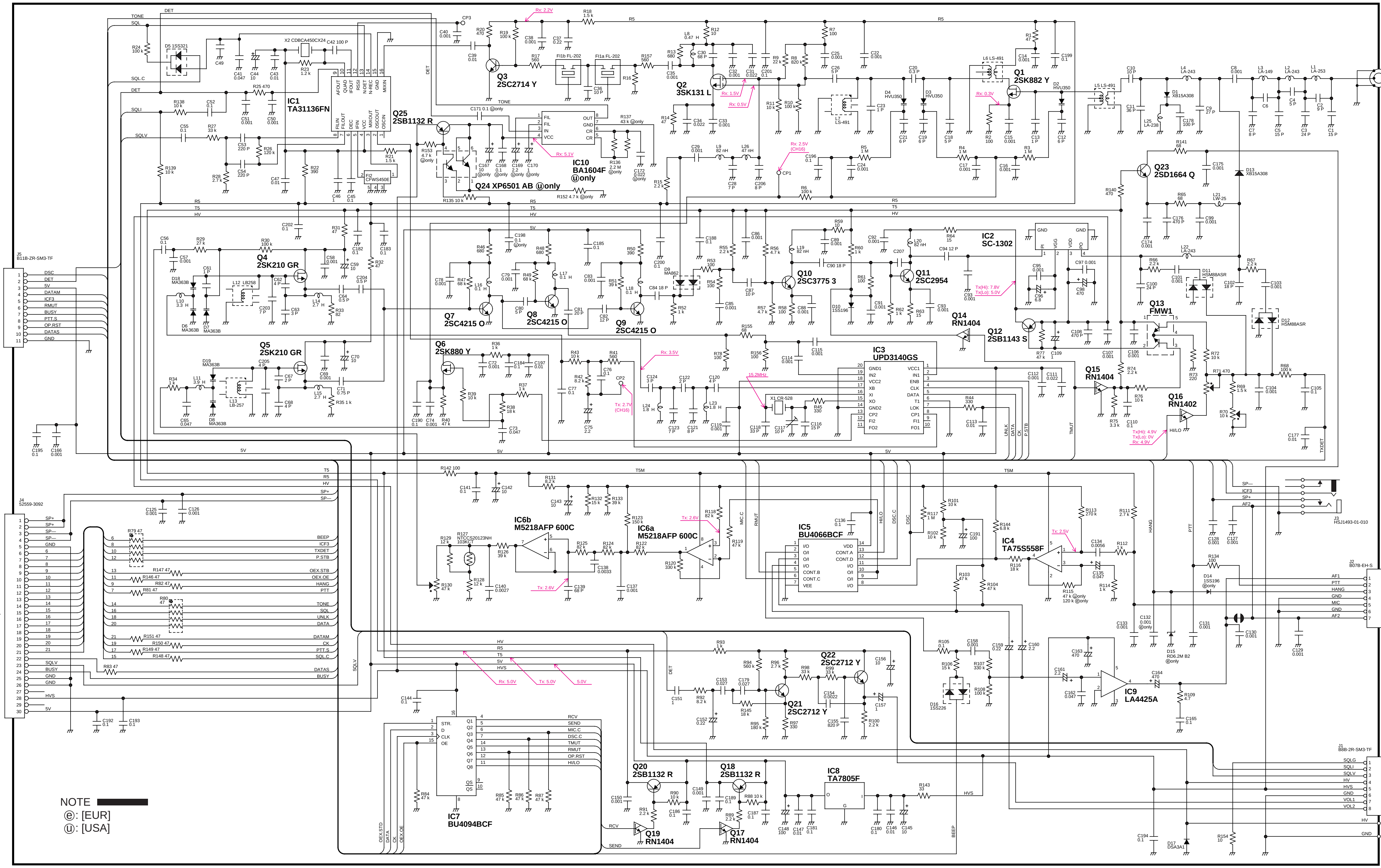


SECTION 10 VOLTAGE DIAGRAM

10-1 LOGIC UNIT

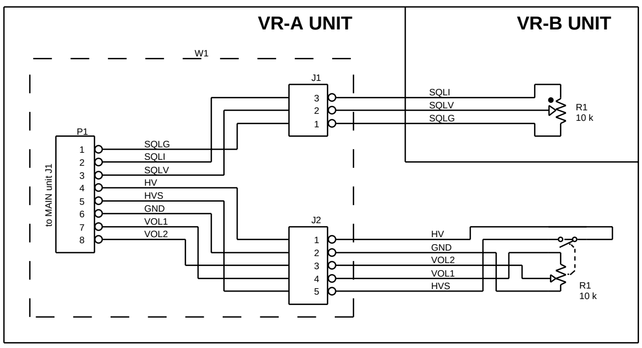


10-2 MAIN UNIT



NOTE
ⓔ: [EUR]
ⓤ: [USA]

10-3 VR-A AND VR-B UNITS



Icom Inc.

6-9-16, Kamihigashi, Hirano-ku, Osaka 547-0002, Japan
Phone : 06 6793 5302
Fax : 06 6793 0013

Icom America Inc.

<Corporate Headquarters>
2380 116th Avenue N.E., Bellevue, WA 98004, U.S.A.
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<Customer Service>
Phone : (425) 454-7619

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Phone : 01227 741741 Fax : 01227 741742
URL : http://www.icomuk.co.uk

Icom France S a

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Count on us!

Icom Inc.
6-9-16, Kamihigashi, Hirano-ku, Osaka, 547-0002, Japan

S-13611IZ-CD